

# ADVERSE PERINATAL OUTCOMES AND ENVIRONMENTAL HAZARDS USING A WATERSHED APPROACH

**Anders C. Erickson MSc**, University of Victoria, Canada  
Laura Arbour MD FRCPC FCCMG, University of Victoria, Canada  
Hing Man Chan PhD, University of Northern British Columbia, Canada

**Background and Aims:** Environmental contaminants linked to increased risks of adverse perinatal outcomes are varied and numerous. The watershed approach framework is able to accommodate a multi-stressor environment as it focuses on hydrologically-defined geographic regions rather than on a single discharger or specific media (e.g. air, water). This paper examines the feasibility of using a watershed approach in the analysis of environmental contaminants and reproductive health in British Columbia, Canada.

**Methods:** Point-source pollution data and adverse birth outcomes were mapped using two similar sized but vastly different spatial tessellations of local watershed areas and administrative census subdivision areas. Pollution data was modelled using the cumulative annual release of a substance within both spatial tessellations and visually compared. Similarly, risk ratios of small-for-gestational age, preterm births and congenital anomalies were calculated for both spatial tessellations and a sensitivity analysis performed to assess rate stability.

**Results:** Unlike administrative census boundaries, watershed areas are independent of population size and therefore were more appropriate to model the environmental hazard data particularly for rural and remote areas with low population densities. With respect to birth outcomes, both tessellations were able to pick up many of the same community-level risk estimates thus confirming and often spatially refining the found result. Due to their slightly larger size, the watershed areas produced more stable risk ratios with less variability when sensitivity analyses were performed (70% vs. 50% of areas remaining significant after sensitivity analysis).

**Conclusions:** The watershed defines an appropriate small-area unit in which to investigate the cumulative impact of multiple physical, chemical, and biological stressors on human populations.